

# PATENT ABSTRACTS OF JAPAN

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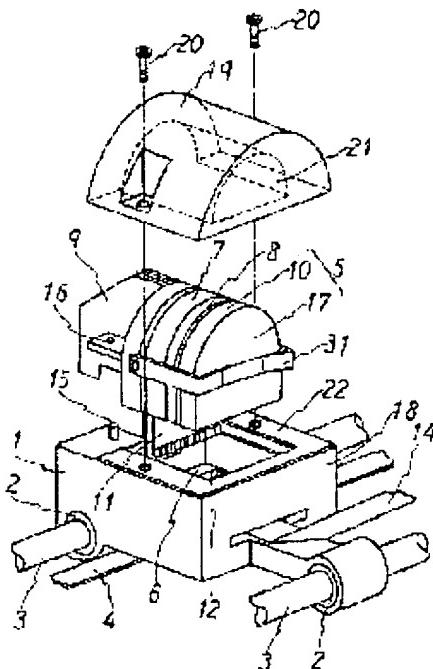
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## (54) IMPACT DOT MATRIX PRINTER

### (57)Abstract:

**PURPOSE:** To provide an impact dot matrix printer, by which continuous printing having high density at high speed is enabled and in which a printing sound is reduced.

**CONSTITUTION:** First yoke 7 and second yoke 8 sections are joined with a carriage 1 from the outer circumferential direction of the first yoke 7 and the second yoke 8 by a cover member 19. A printing head 5 is covered with a cover member 19 fixed to the carriage 1. Accordingly, heat transfer properties from the first yoke 7 and the second yoke 8 to the carriage 1 are improved largely, and a magnetic coil is not overheated, thus eliminating the need for limiting printing. The sound of the printing head 5 can be shielded by the cover member 19 having a low emitted sound.



## LEGAL STATUS

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]**

[0001]

[Industrial Application] This invention relates to an impact dot matrix printer.

[0002]

[Description of the Prior Art] What was equipped with the print head indicated by JP,63-173649,A, for example as a conventional impact dot matrix printer is known. Then, the electromagnetism by which a print head 100 is not illustrated inside as what is indicated is shown in drawing 5 -- it is fixed to carriage 106 through the holddown member 105 equipped with the flange 104 joined to the receptacle section 102 which the periphery of the yoke 101 equipped with the coil joins in the amateur side edge side 103. [0003] Moreover, what was equipped with the print head indicated by JP,1-190461,A public relations, for example as a conventional impact dot matrix printer is known. Then, what is indicated seals the tooth back of a print head 200 from on a radiator 201 by the covered member 202 which consists of elastic material, as shown in drawing 6.

[0004]

[Problem(s) to be Solved by the Invention] However, since it was fixed to a holddown member 105 in a flange 104, the conventional impact dot matrix printer of the heat transfer from the yoke 101 which the yoke 101 and the holddown member 105 were not fixed strongly, but included the source of generation of heat to a holddown member 105 shown in drawing 5 was inadequate [the print head 100]. Since the heat transfer to carriage 106 was furthermore made through a holddown member 105, thermal resistance became large and the heat transfer to other members of carriage 106 and guide shaft 107 grade was inadequate. Therefore -- such an impact dot matrix printer of structure -- the alphabetic character of high density etc. -- a high speed -- and -- if it prints continuously -- the electromagnetism in a yoke 101 -- in order that the heat generated from a coil might exceed and carry out the temperature rise of the heat release, there was a problem of it becoming impossible to make printing actuation continue.

[0005] Moreover, in the conventional impact dot matrix printer shown in drawing 6, since a radiator 201 was fixed to the print head 200 which is a vibration source and it was not fixed to other members, the oscillation of a radiator was not restrained but had the problem that the radiation sound of a radiator was loud.

[0006] Then, this invention aims at having been made in order to solve such a trouble, and obtaining a high speed and the impact dot matrix printer which can be carried out continuously for printing of high density. Moreover, it aims at obtaining an impact dot matrix printer with a small printing sound.

[0007]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the impact dot matrix printer of this invention electromagnetism -- a coil and electromagnetism -- the yoke furnished with a coil, and the amateur who prepared in the edge of a yoke -- a magnetic circuit -- forming -- amateur -- said electromagnetism -- with the print head which prints by driving with a coil. In the impact dot matrix printer equipped with the carriage which carried the print head, while constituting carriage from thermally conductive high construction material, it is characterized by pinching a yoke

between a covering member and carriage by the covering member.

[0008] Moreover, it is characterized by making the elastic sheet of heat-conducting characteristic intervene between a covering member and carriage.

[0009] moreover, electromagnetism -- a coil and electromagnetism -- the yoke with which a coil is attached, and the amateur who prepared in the edge of a yoke -- a magnetic circuit -- forming -- amateur -- electromagnetism -- in the impact dot matrix printer equipped with the print head which prints by driving with a coil, and the carriage which carried the print head, it is fixed to carriage and characterized by covering member preparation \*\*\*\*\* which seals a print head.

[0010]

[Function] in order to join strongly a yoke including the source of generation of heat to carriage directly according to the above-mentioned configuration of this invention -- heat transfer to carriage -- enough -- the electromagnetism in a next door yoke -- it becomes possible to prevent the temperature rise of a coil. therefore, electromagnetism -- overheating of a coil does not need to restrict printing and it becomes possible about printing of high density a high speed and to print continuously. Moreover, since a print head is covered with the covering member fixed to carriage, the sound generated from a print head is covered. Moreover, since the radiation sound of a covering member is also fixed to carriage and an oscillation is suppressed, it is small. Therefore, an impact dot matrix printer with a small printing sound can be obtained.

[0011]

[Example] The example of this invention is explained based on a drawing below. Drawing 1 is the front view of the example of the impact dot matrix printer of this invention. Drawing 2 is the side elevation of the example of this invention. Drawing 3 is the fragmentary sectional view showing the A-A cross section of drawing 1. Drawing 4 is the print head of the example of this invention, a covering member, and the decomposition perspective view of carriage.

[0012] A configuration is explained based on drawing 1 - drawing 4. The carriage 1 which consists of thermally conductive high aluminum dies casting is attached in the metal guide shaft 3 possible [ sliding ] through the metal bush 2 where a sliding friction is small. Sliding actuation of the carriage 1 is carried out with a belt 4 during printing actuation. The receptacle section 6 for receiving a print head 5 in carriage 1 is formed, the 1st yoke 7 and the 2nd yoke 8 win popularity, and it joins to the section 6. In this example, the nose 9 and the electrode holder 10 are also joined to the receptacle section 6 of the same field with the 1st yoke 7 and the 2nd yoke 8, and since the 1st yoke 7, the 2nd yoke 8, a nose 9, and an electrode holder 10 are held in respect of the same, the location of a mutual member serves as accuracy. Moreover, the slit 12 in which a substrate 11 is inserted is formed in the receptacle section 6. A connector 13 is held under a slit 12, and a substrate 11 is inserted in a connector 13, when a print head 5 is received and it joins to the section 6. The connector 13 is connected with the driver line which is not illustrated through the flat cable 14. A gage pin 15 can get down to carriage 1 earnestly, it can engage with the locating hole 16 of a nose 9, and the horizontal location of a print head 5 can be decided to be accuracy.

[0013] Moreover, the wrap wall 18 is formed in carriage 1 in the tooth back 17 of a print head 5. The covering member 19 which consists of thermally conductive good aluminum die casting is fixed to carriage 1 while it pinches the 1st yoke 7 and the 2nd yoke 8 between carriage 1 and combines the 1st yoke 7 and the 2nd yoke 8 with the receptacle section 6 of carriage 1 strongly with the fixed screw 20. Moreover, in this example, since a nose 9 and an electrode holder 10 are also pinched between the covering member 19 and carriage 1 and are stuck in the receptacle section 6 of carriage 1, the location the 1st yoke 7, the 2nd yoke 8, a nose 9, and between electrode-holder 10 serves as accuracy. The wrap wall 21 is formed in the covering member 19 in the tooth back 17 of a print head 5. When the elastic sheet 22 which consists of thermally conductive good silicone rubber intervenes between the covering member 19 and the plane of composition of carriage 1 and the covering member 19 is fixed, it stuck to covering member 19 and carriage 1 both sides, and the print head 5 is sealed.

[0014] Next, based on drawing 3, the internal structure of a print head 5 and actuation are explained. Although this example has 24 printing wires, since it is the same, each explains the configuration and

actuation which drive each printing wire about one printing wire 23. the electromagnetism by which the coil was twisted around the coil bobbin 25 at the 1st yoke 7 which consists of an ingredient of high permeability to the core 24 which have been arranged on a flat surface, and was formed at one -- it is equipped with the coil 26. [ two or more ] electromagnetism -- the terminal of a coil 26 was soldered to the substrate 11 through the electric insulating plate 27, the substrate 11 was inserted in the connector 13, and it is connected with the driver line which is not illustrated through the flat cable 14. The laminating of the 2nd yoke 8, the 1st spacer 28, a locating plate 29, the 2nd spacer 30, and the electrode holder 10 is carried out, and they are being fixed to the 1st yoke 7 by the flat spring 31 to the nose 9. electromagnetism -- the clearance between a coil 26 and the 1st yoke 7 is filled up with resin 32 with high thermal conductivity. The amateur 33 who consists of a magnetic material of high permeability is supported pivotable with a rocking lever shaft 34. A rocking lever shaft 34 is pinched by the 1st spacer 28 and the 2nd spacer 30, and is positioned by the locating plate 29. Amateur 33 is pushed with the return spring 36 held at the spring attachment component 35, and is pushed against the damper 37. The printing wire 23 fixes at amateur's 33 head, and is held possible [ sliding ] at two or more wire guides 41.

[0015] the driver line which is not illustrated -- electromagnetism -- it prints by \*\*\*\*(ing) to the printing medium 39 which the printing wire 23 flew [ in / magnetic flux occurs in the magnetic circuit which will consist of the 1st yoke 7, the 2nd yoke 8, and amateur 33 if a coil 26 energizes, and amateur 33 is attracted to a core 24, and / drawing 3 ] to the right sense, and was held through the ink ribbon 38 at the platen 40. After printing, amateur 33 is pressed by the return spring 36 and returns to a position in readiness. In addition, a sign 41 shows a wire guide.

[0016] Next, an operation of this example is explained based on drawing 1 - drawing 4. electromagnetism -- if it energizes in a coil 26 -- electromagnetism -- while the heat by joule loss occurs with a coil 26, heat occurs with iron loss also in a magnetic circuit, but since the 1st yoke 7 and the 2nd yoke 8 have joined to the receptacle section 6 of carriage 1 strongly by the covering member 19, heat is promptly radiated on carriage 1. therefore -- even if it carries out printing of high density to a high speed and continuation -- electromagnetism -- a coil 26 is not overheated but it becomes unnecessary to restrict the amount of printing Heat transfer of the heat transmitted to carriage 1 is carried out to the metal guide shaft 3 through the further metal bush 2, and it can prevent the temperature rise of carriage 1. moreover, since the covering member 19 consisted of a thermally conductive high ingredient and it has joined to the 1st yoke 7 and the 2nd yoke 8, heat is efficiently radiated also from the covering member 19 -- having -- electromagnetism -- overheating of a coil 26 can be prevented. If the covering member 19 is equipped with a radiation fin, it cannot be overemphasized that heat dissipation nature improves. Moreover, since the thermally conductive high elastic sheet 22 was infixed between the covering member 19 and carriage 1, heat transfer between the covering member 19 and carriage 1 becomes good, and heat can be promptly radiated in other locations in the heat generated at a part of print head 5.

[0017] Moreover, although impulsive sound occurs at the time of printing medium \*\*\*\* of the printing wire 23, and the return to a position in readiness, since the covering member 19 seals a print head 5, the sound generated from a print head 5 can be covered. Moreover, since it is fixed to carriage 1, an oscillation is suppressed, and the covering member 19 becomes what also has a low radiation sound from the covering member 19. Moreover, since it had the elastic sheet 22, while sealing nature goes up and making electric shielding of a sound into a clear thing, it also has the effectiveness which absorbs an oscillation of carriage 1 and the covering member 19. If carriage 1 and the covering member 19 are formed with the ingredient of damping nature, it cannot be overemphasized that the noise can be reduced further.

[0018]

[Effect of the Invention] as stated above, in order to join strongly to carriage the yoke which included the source of generation of heat by the covering member from a periphery according to this invention -- the heat-conducting characteristic to carriage -- large -- improving -- electromagnetism -- it is possible to prevent the temperature rise of a coil -- becoming -- \*\*. therefore, electromagnetism -- since overheating of a coil can be prevented, it becomes unnecessary to restrict printing and it becomes possible about

printing of high density a high speed and to carry out continuously. Moreover, since the print head was covered by the covering member fixed to carriage, an impact dot matrix printer with a small printing sound can be obtained.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

- [Drawing 1] The front view showing the example of the impact dot impact printer of this invention.  
[Drawing 2] The side elevation showing the example of the impact dot impact printer of this invention.  
[Drawing 3] The fragmentary sectional view of the A-A side of the impact dot impact printer of this invention shown in drawing 1.  
[Drawing 4] The decomposition perspective view of the impact dot impact printer of this invention.  
[Drawing 5] The decomposition perspective view of the conventional dot impact printer.  
[Drawing 6] The decomposition perspective view of the conventional dot impact printer.

**[Description of Notations]**

- 1 Carriage
- 2 Bush
- 3 Guide Shaft
- 4 Belt
- 5 Print Head
- 6 Receptacle Section
- 7 1st Yoke
- 8 2nd Yoke
- 9 Nose
- 10 Electrode Holder
- 11 Substrate
- 12 Slit
- 13 Connector
- 14 Flat Cable
- 15 Gage Pin
- 16 Locating Hole
- 17 Tooth Back
- 18 Wall
- 19 Covering Member
- 20 Fixed Screw
- 21 Wall
- 22 Elastic Sheet
- 23 Printing Wire
- 24 Printing Wire
- 25 Bobbin
- 26 Electromagnetism -- Coil
- 27 Electric Insulating Plate
- 28 1st Spacer
- 29 Locating Plate

30 2nd Spacer  
31 Flat Spring  
32 Resin  
33 Amateur  
34 Rocking Lever Shaft  
35 Spring Attachment Component  
36 Return Spring  
37 Damper  
38 Ink Ribbon  
39 Printing Medium  
40 Platen  
41 Wire Guide

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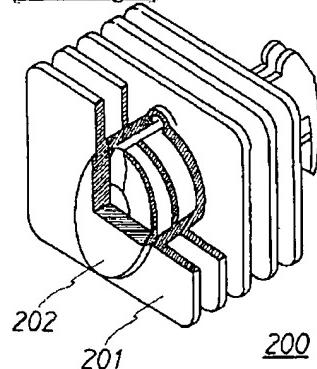
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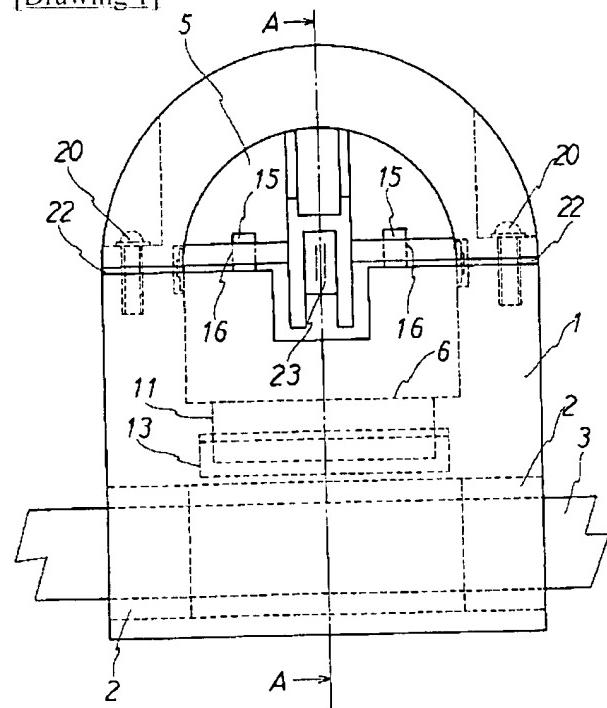
**DRAWINGS**

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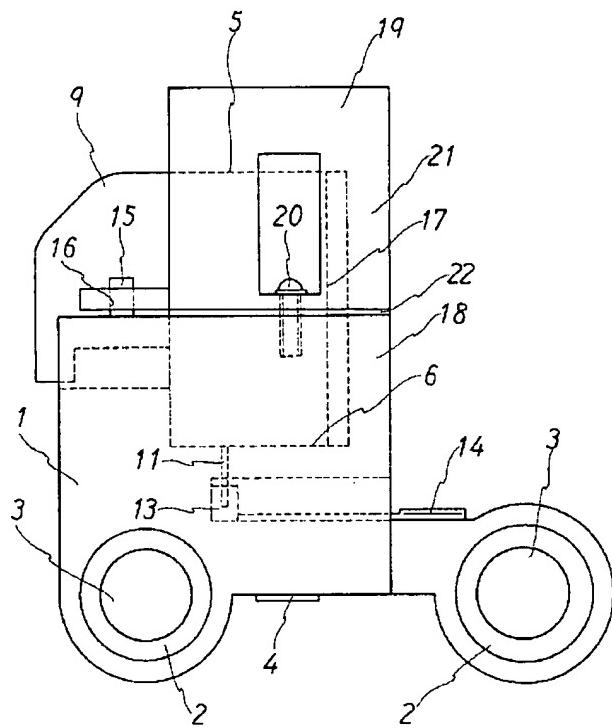
[Drawing 6]



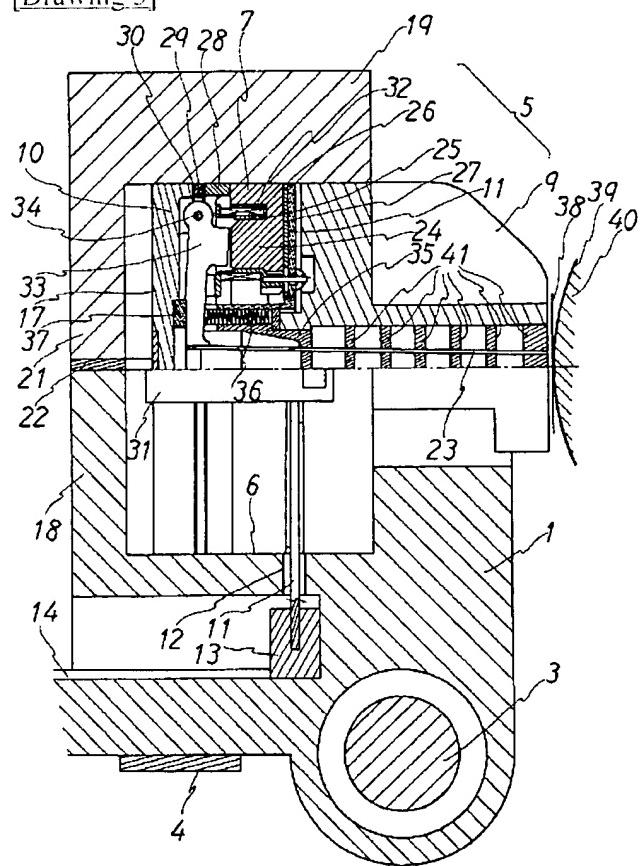
[Drawing 1]



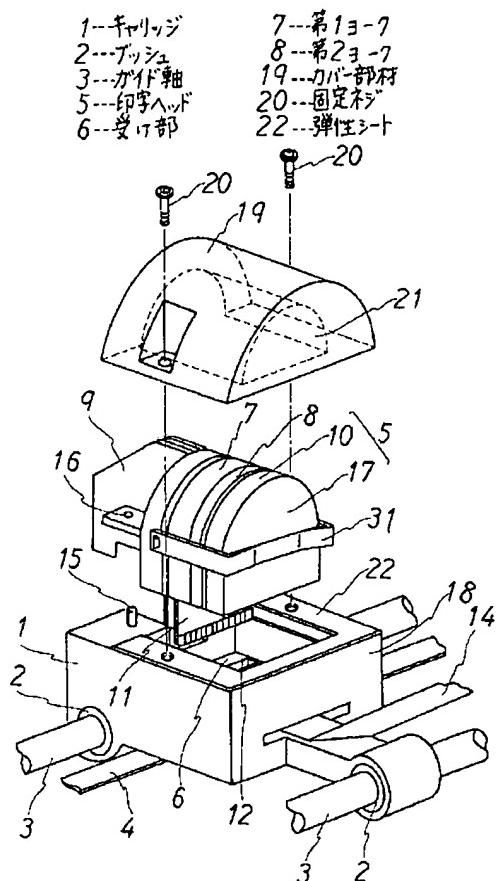
[Drawing 2]



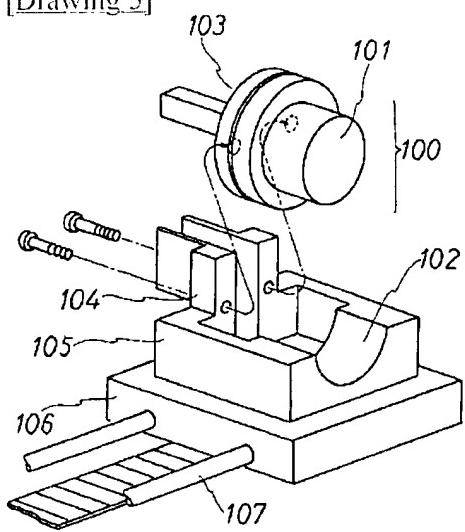
[Drawing 3]



[Drawing 4]



[Drawing 5]



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